WHAT IS CLAIMED IS:

1. A radiation detector provided in a substrate with a detection layer which is sensitive to radiation, the detector comprising: said detection layer formed by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, and doped with Cl.

2. The radiation detector according to claim 1, wherein said detection layer is formed by vapor deposition or sublimation while using as a source, a mixture of a first material including at least one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) and a second material including at least one of $CdCl_2$ (cadmium chloride) or $ZnCl_2$ (zinc chloride).

3. The radiation detector according to claim 2, wherein said detection layer is formed in the condition that said substrate and said source are closely opposed to each other.

4. A radiation detector provided in a substrate with a detection layer which is sensitive to radiation, the

detector comprising: said detection layer formed by, after forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, doping Cl by heating while supplying said detection layer with vapor containing Cl atoms.

5. The radiation detector according to claim 4, wherein the detection layer is doped with Cl by conducting heat treatment in the condition that powder containing at least one of $CdCl_2$ (cadmium chloride) or $ZnCl_2$ (zinc chloride) or its sintered body is opposed.

6. The radiation detector according to claim 5, wherein atmosphere of said heat treatment contains at least one of N_2, O_2, H_2 and noble gases (He, Ne, Ar) kept at 1 atmospheric pressure.

7. The radiation detector according to claim 5, wherein atmosphere of said heat treatment contains at least one of N_2, O_2, H_2 and noble gases (He, Ne, Ar) kept at 1.3×10^{-4} to 0.5 atmospheric pressure.

8. A radiation detector provided in a substrate with

a detection layer which is sensitive to radiation, the detector comprising: said detection layer formed by, after forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, doping Cl by heating while supplying said detection layer with gas containing Cl atoms.

9. A radiation detector provided in a substrate with a detection layer which is sensitive to radiation, the detector comprising:

forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, and

doping said detection layer with Cl;

or

forming said detection layer by vapor deposition or sublimation while using as a source, a mixture of a first material including at least one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) and a second material including at least one of $CdCl_2$ (cadmium chloride) or $ZnCl_2$ (zinc chloride),

or

forming said detection layer by sublimation with said substrate and said source being closely opposed,

further,

after forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, doping with Cl by heating while supplying said detection layer with vapor containing Cl atoms,

or

doping said detection layer with Cl by heat treatment with powder containing at least one of $CdCl_2$ (cadmium chloride) or $ZnCl_2$ (zinc chloride) or its sintered body being closely opposed,

or

atmosphere of said heat treatment containing at least one of N_2, O_2, H_2 and noble gases (He, Ne, Ar) kept at 1 atmospheric pressure,

or

after forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including

at least one thereof, doping with Cl by heating while supplying said detection layer with gas containing Cl atoms,

or

after forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least one thereof, doping with Cl by heating while supplying said detection layer with gas containing Cl atoms.

10. A radiation imaging apparatus comprising:

the radiation detector according to claim 1;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

11. A radiation imaging apparatus comprising:

the radiation detector according to claim 2;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

12. A radiation imaging apparatus comprising:

the radiation detector according to claim 3;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

13. A radiation imaging apparatus comprising:

the radiation detector according to claim 4;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

14. A radiation imaging apparatus comprising:

the radiation detector according to claim 5;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

15. A radiation imaging apparatus comprising:

the radiation detector according to claim 6;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

16. A radiation imaging apparatus comprising:

the radiation detector according to claim 7;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

17. A radiation imaging apparatus comprising:

the radiation detector according to claim 8;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

18. A radiation imaging apparatus comprising:

the radiation detector according to claim 9;

a plurality of charge accumulation capacitors for accumulating charges from said conversion layer; and

a switching matrix substrate including switching devices arranged in array for reading out charges of said plurality of charge accumulation capacitors and driving and reading circuits.

19. A method for producing a radiation detector provided in a substrate with a detection layer which is sensitive to radiation, comprising the steps of:

forming said detection layer by a polycrystal film comprising either one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) or a laminate film of polycrystal including at least

one thereof, and

doping said detection layer with Cl.

20. The method according to claim 19, wherein said detection layer is formed by vapor deposition or sublimation while using as a source, a mixture of a first material including at least one of CdTe (cadmium telluride), ZnTe (zinc telluride) and CdZnTe (cadmium zinc telluride) and a second material including at least one of $CdCl_2$ (cadmium chloride) or $ZnCl_2$ (zinc chloride).